Antarctica's past shows region's vulnerability to climate change

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Fresh understanding of West Antarctica has revealed how the region's ice sheet could become unstable in a warming world.

Scientists studying the region's landscape have determined how it reacted to a period of warming after the coldest point of the most recent Ice Age, some 21,000 years ago.

As the Earth warmed, the West Antarctic Ice Sheet reached a tipping point after which it thinned relatively quickly, losing 400m of thickness in 3,000 years, researchers found. This caused sea levels around the world to increase by up to two metres.

Their findings will help scientists understand how the region may behave under future environmental change.

Researchers studied peaks protruding through ice in the Ellsworth Mountains on the Atlantic coast of the continent, to determine how the land's ice coverage has changed since the Ice Age.

Scientists used chemical technology - known as exposure dating - to calculate how long rocks on the mountainside had been free from ice cover. They used their results to determine how the height of the ice sheet had changed over thousands of years.

They found that this sector of the ice sheet - close to the Weddell Sea - had remained covered with thick ice long after other parts of the Earth

had begun to emerge from the Ice Age. Heavier snowfall, caused by warmer air, probably helped to maintain the ice thickness.

As the seas warmed, ice at the coast began to be lost to the oceans. Eventually, a tipping point was reached after which the ice sheet thinned more rapidly, retreating inland.

The study, carried out in collaboration with Northumbria University, Newcastle University and the Scottish Universities Environmental Research Centre, was published in *Nature Communications*. It was supported by the Natural Environment Research Council.

Dr Andrew Hein of the University of Edinburgh's School of GeoSciences, who jointly led the study, said: "West Antarctica has undergone complex changes since the last Ice Age, and it quickly became unstable - similar processes may dominate the future of the region in a warmer world."

Provided by University of Edinburgh